Closing the literacy gap for students in K–5

Boost Reading drives significant positive student outcomes in the 2020–21 school year

Jennie Zoski, Ph.D., Staff Learning Scientist
Steve Newton, Ph.D., Psychometrician
Yukie Toyama, Ph.D., Psychometrician

Amplify.

Study highlights

Boost Reading is a reading acceleration program for grades K–5 that leverages the power of compelling storytelling to engage students in personalized reading instruction and practice. This study explores the effectiveness of the program for students in kindergarten through fifth grade.

Scores improve with 30 or more minutes per week

With 30 or more minutes of use per week, Boost Reading students improved significantly more in every DIBELS® 8th Edition measure across all grade levels.
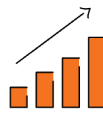
Moving the needle for at-risk students

Students using Boost Reading who started the year well below or below benchmark were 36% more likely to finish the year on track than students who did not use Boost Reading.
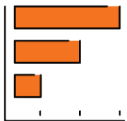
Closing the gap for ELLs

English language learners who started the year below benchmark were 43% more likely to finish the year on track compared to those who did not use Boost Reading.

ESSA Moderate Tier

The study includes characteristics required for meeting ESSA's Moderate (Tier 2) Evidence criteria, showing significant and positive effects on student outcomes in all grades.

Boost Reading increases the percentage of students on track for reading success in all grades.

A larger percentage of Boost Reading students finished the year on track (at or above benchmark) compared to a matched group of students who did not use Boost Reading (Table A1).
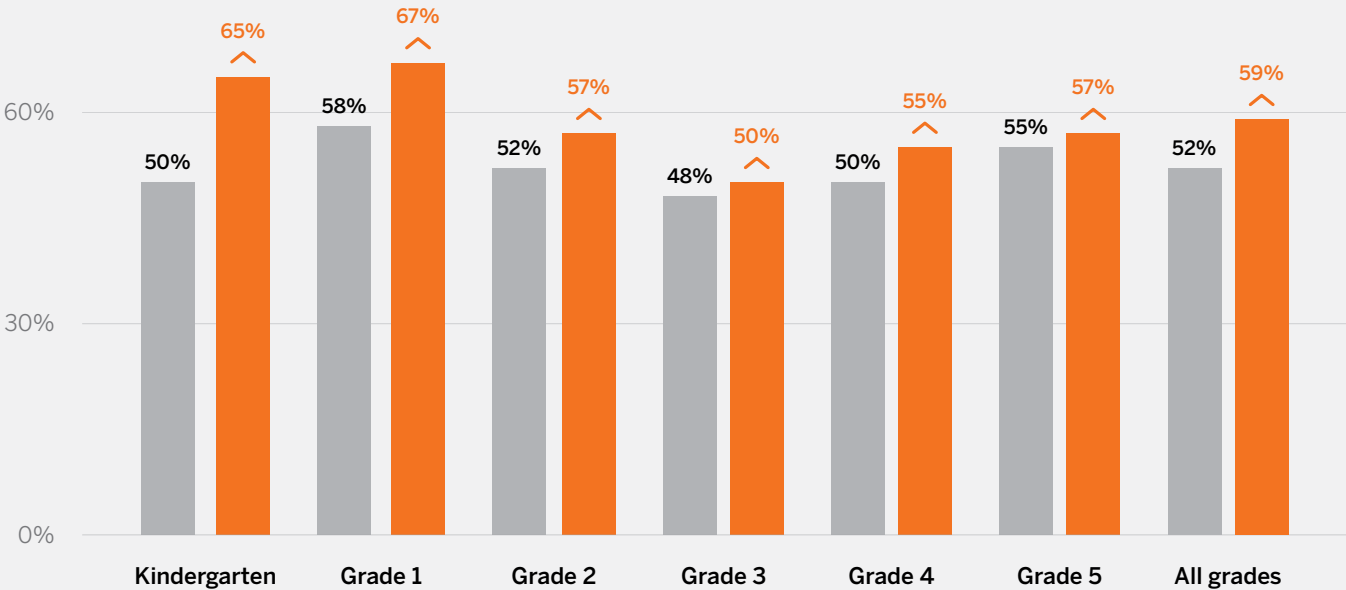
There is an urgent need to provide effective reading instruction, especially instruction that can help students who are behind to catch up and read at grade level. The COVID-19 pandemic resulted in instructional loss in reading for many elementary school students, with the largest losses evident in the youngest students (Amplify, 2022). Students with the lowest reading skills tended to fall further behind. Although students resumed progress rates in 2021–22, too few students are reading at grade level. It is more important than ever to identify and embrace effective practices and programs that support student reading growth.

On average across K–5,

59%

of students using Boost Reading finished the year at benchmark or above, compared to only 52% in the comparison group.

Students who finished the 2020–21 school year on track for reading success

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	All grades
Comparison group	50%	58%	52%	48%	50%	55%	52%
Boost Reading group	65%	67%	57%	50%	55%	57%	59%

■ Comparison group   ■ Boost Reading group

Boost Reading increases the percentage of students who move from at-risk to benchmark or above in all grades.
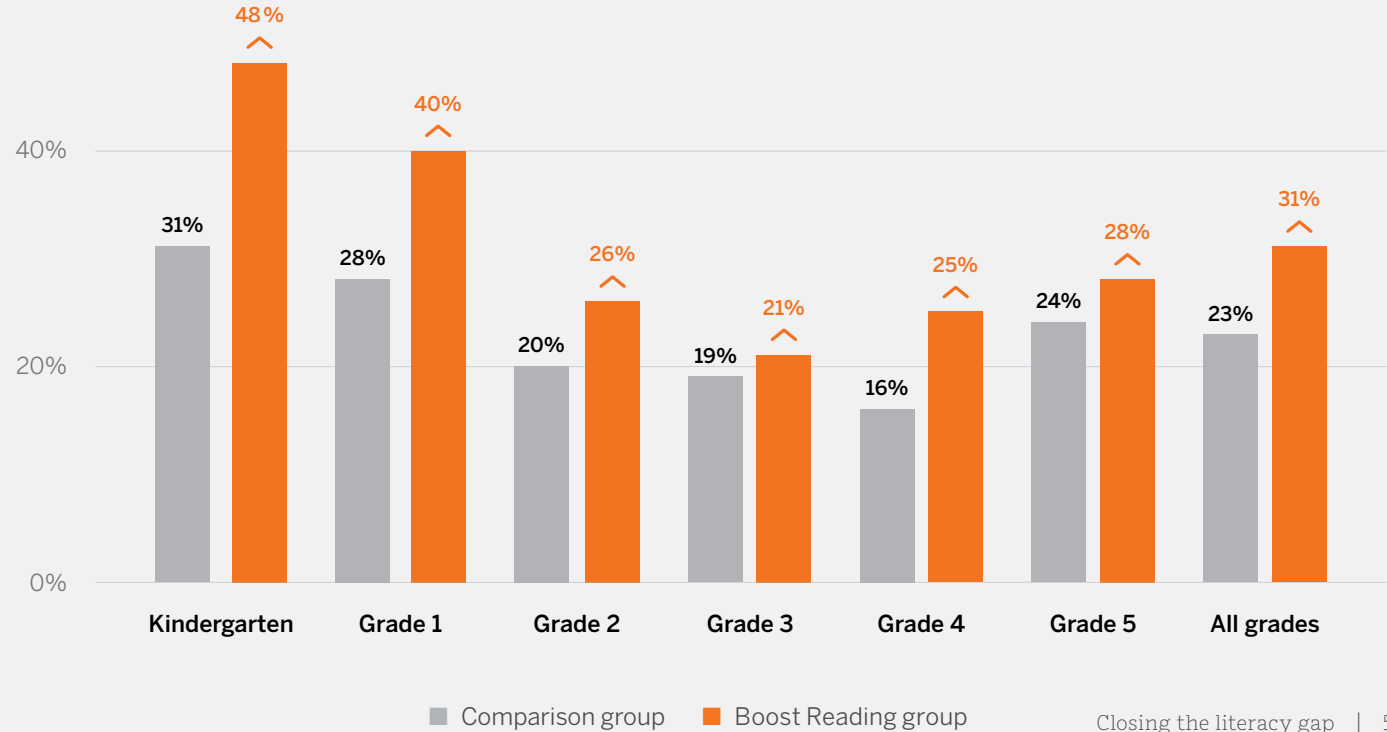
Larger percentages of Boost Reading students who started the year at risk (below or well below benchmark) moved up to at or above benchmark by the end of the year, compared to a matched group of at-risk students who did not use Boost Reading.

In kindergarten,

48%

of at-risk students in the Boost Reading group ended the year at benchmark or above, compared to 31% of the comparison group.

At-risk students who finished the 2020–2021 school year on track for reading success

Grade	Comparison group	Boost Reading group
Kindergarten	31%	48%
Grade 1	28%	40%
Grade 2	20%	26%
Grade 3	19%	21%
Grade 4	16%	25%
Grade 5	24%	28%
All grades	23%	31%

■ Comparison group ■ Boost Reading group

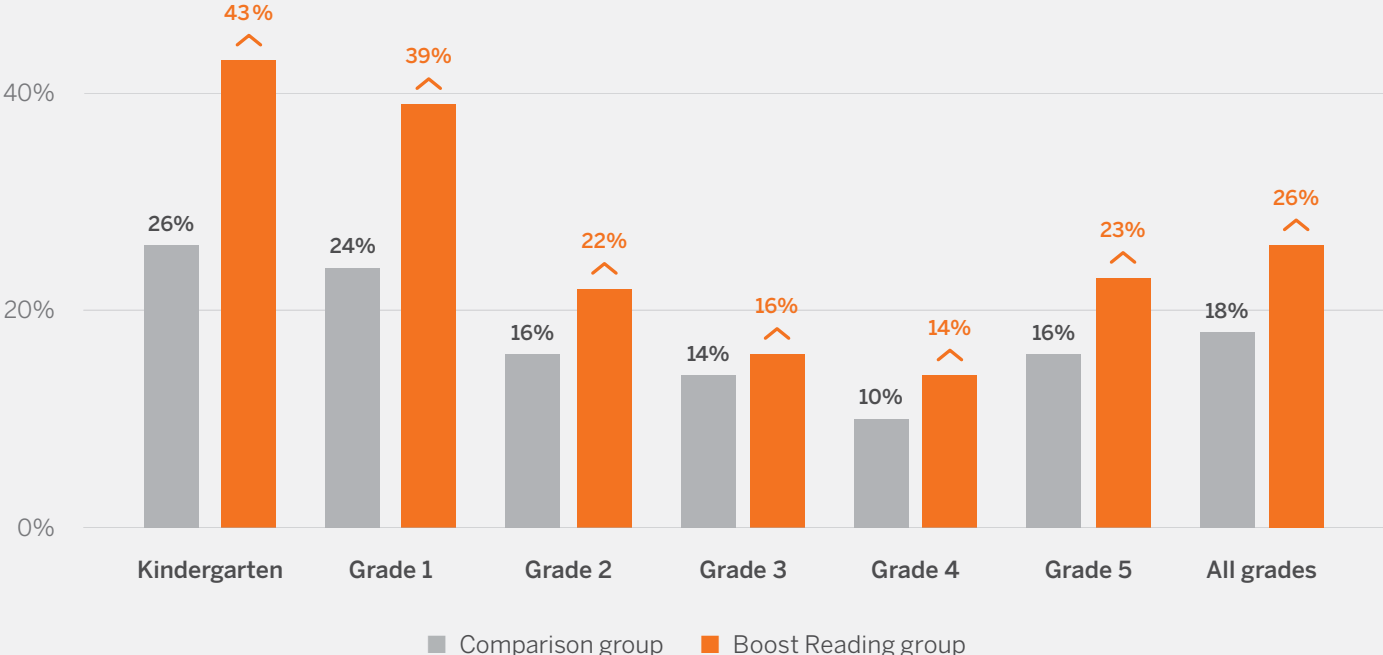# Boost Reading reduces the opportunity gap for English language learners.

Larger percentages of English language learners who started the year at risk (below or well below benchmark) and used Boost Reading moved up to at or above benchmark by the end of the year, compared to a matched group of at-risk English language learners who did not use Boost Reading.

Kindergarten and first-grade students in particular saw notable gains.

This finding is vitally important in today's educational landscape. Roughly 10.4% or 5.1 million public school students are ELLs and the fourth-grade reading achievement gap between ELLs and non-ELLs has remained wide and stable over the past 20 years (U.S. Department of Education). Boost Reading, with its highly adaptive platform and focus on early literacy skills, is a program that has great potential to meet the needs of the rising percentage of English language learners.

In kindergarten,

43%

of at-risk English language learners in the Boost Reading group ended the year at benchmark or above, compared to 26% of the comparison group.

At-risk English language learners who finished the 2020–2021 school year on track for reading success

	Comparison group	Boost Reading group
Kindergarten	26%	43%
Grade 1	24%	39%
Grade 2	16%	22%
Grade 3	14%	16%
Grade 4	10%	14%
Grade 5	16%	23%
All grades	18%	26%

■ Comparison group   ■ Boost Reading group

Background

Boost Reading is a reading acceleration program for grades K–5 that leverages the power of compelling storytelling to engage students in personalized reading instruction and practice. Whether students are just learning to read or are mastering reading complex texts, Boost Reading helps them build the skills that they need, at a pace that supports their individual development. It provides students with targeted and engaging instruction and practice in the key skills that students need to become successful readers: phonological awareness, phonics, decoding, fluency, vocabulary, and comprehension.

This study explores the effectiveness of the program for students in kindergarten through fifth grade. It compares more than 32,000 students who used Boost Reading for at least 15 total hours during the 2020–21 school year with a matched comparison group of over 97,000 students who did not use Boost Reading, using Dynamic Indicators of Basic Early Literacy Skills, 8th Edition (DIBELS 8th Edition).

> Students in all grades who used Boost reading for 30 minutes or more per week made significantly greater gains in word reading, oral reading fluency, and comprehension.

Additionally, the results showed that:

- Boost Reading students were more likely to finish the year at benchmark or above.

- Students (including English language learners) who began the year at risk for reading difficulties were more likely to end the year at benchmark or above if they used Boost Reading.

- Students made these gains during the 2020–21 school year despite interrupted instruction and other challenges related to the pandemic.

This research used a rigorous quasi-experimental method called propensity score matching (Rosenbaum & Rubin, 1983), which makes the treatment and the control groups as similar as possible in terms of student and school characteristics. The study showed significant and positive effects on student outcomes with large matched groups, which is required for the Every Student Succeeds Act's Tier 2 Moderate Evidence.
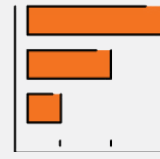
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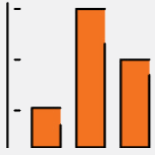
Study details

- Boost Reading group: 32,502
- Comparison group: 97,479
- Grades: K–5
- School year: 2020–21
- City, suburban, town, rural schools

Demographics

- 55% Hispanic
- 19% Black
- 19% White
- 4% Asian
- 4% Other

Education needs

- 24% were English language learners
- 35% were considered at risk for reading difficulty
- 10% qualified for special education services

Participants were students in K–5 from schools across the United States; settings included small, large, and charter schools, and represented cities, suburbs, towns, and rural areas.

To be included in the Boost Reading group, students had to have used Boost Reading for a minimum of 15 total hours (i.e., approximately 30 minutes per week) between the beginning of year (BOY) and end of year (EOY) during the 2020–21 school year. The resulting group included between 1,088–10,383 students per grade and outcome measure; across all grades for the Composite Score, the total Boost Reading group included 32,502 students (Table A2).

Demographic details

The demographic breakdown of the group varied slightly by outcome measure and grade. Across all grades for the Composite Score, students were 55% Hispanic, 19% Black, 19% White, 4% Asian, and 4% Other.

Educational needs

Approximately 24% were English language learners; 10% qualified for special education services; and 35% were considered at risk for reading difficulty at the beginning of year, based on a well below benchmark score on DIBELS 8th Edition (Table A3).

Methodology

During the 2020–21 school year, students in the Boost Reading group used Boost Reading for a minimum of 15 hours. Average usage varied across grades and ranged from 24.5 hours in grade 4 to 28.8 hours in kindergarten (Table A4).

We used propensity-score matching to identify a comparison group of students who came from similar schools who had demographics and achievement similar to those who used Boost Reading (Rosenbaum & Rubin, 1983). We estimated propensity scores for each individual using student-level variables (i.e., beginning-of-year DIBELS 8th Edition Composite Score, gender, race, special education status, English learner status, and number of days between the beginning- and end-of-year assessments) and school-level characteristics (i.e., charter or magnet school status, number of students, teacher-to-student ratio and, critically, the proportion of treatment students to comparison students in the school).

To achieve a good distributional balance, the nearest neighbor-matching algorithm (Rosenbaum & Rubin, 1985) with a 3:1 ratio with replacement was used, resulting in each treatment student being matched with up to three comparison-group students. After matching, propensity-score distributions were almost identical and a good covariate balance (standardized mean difference <.1) was achieved for the majority of the covariates and their interactions that represent sub-groups.

The Dynamic Indicators of Basic Early Literacy Skills (DIBELS) 8th Edition is a universal screening and progress monitoring assessment that measures early literacy skills from kindergarten through eighth grade (University of Oregon, 2020). In kindergarten through fifth grade, the assessment includes six measures that serve as indicators of reading skills, including:

- Alphabet knowledge

- Phonemic awareness

- Alphabetic principle/phonics

- Fluency

- Reading comprehension

The measures of earlier skills are administered one-on-one with students by qualified professionals; the comprehension assessment is group-administered starting in second grade.

DIBELS 8th Edition also includes a Composite Score with a corresponding benchmark status. This Composite Score is computed using all of the measure scores and is the best indicator of students' overall risk for reading difficulty.

To assess the effect of Boost Reading on students' reading performance, we used a two-level Hierarchical Linear Model, setting level 1 as students and level 2 as schools (Raudenbush & Bryk, 2002). Using students' beginning-of-year to end-of-year change scores as the outcome, we analyzed results for the following DIBELS 8th Edition subtests: Oral Reading Fluency (ORF), Maze, and Nonsense Word Fluency (NWF). The model was applied after identifying the matched comparison groups for each grade-subtest combination. This approach helped account for the nested structure of the data while controlling for school and student variables to remove bias and add precision of the estimates.

Detailed results

The analysis found that Boost Reading had statistically significant effects on all DIBELS 8th Edition subtests in all relevant grade levels (p < 0.01). Effects were particularly large in kindergarten and first grade, ranging from .34 to .55, while effects in grades 2–5 ranged from .07 to .31 (Table A5). These effects are all considered medium to large in causal studies of educational interventions (Kraft, 2020).

DIBELS 8th Edition Oral Reading Fluency (ORF) results

The Oral Reading Fluency (ORF) measure is a standardized, individually administered assessment of accuracy and fluency with connected text. ORF is administered to students in the beginning of first grade through the end of sixth grade. ORF assesses a student's ability to read words in connected text.

In ORF, the examiner presents the student with a passage and asks the student to read the passage aloud for one minute. Words omitted or substituted, and hesitations of more than three seconds, are scored as errors. Words self-corrected within three seconds are scored as accurate. The final score is the number of words read correctly (and self-corrected) within one minute.

Students across all grades who used Boost Reading showed larger average gains in their Oral Reading Fluency compared to their matched comparisons who did not use Boost Reading, with the largest additional gains in first and fifth grades (Table 1).

Boost Reading students gained an average of

+4.97

points more than the comparison group on their Oral Reading Fluency scores.

DIBELS Oral Reading Fluency scores from BOY to EOY

Grade	Comparison group size	Boost Reading group size	Mean BOY to EOY points gained: Comparison group	Mean BOY to EOY points gained: Boost Reading group	Additional points gained for the Boost Reading group	Effect size
Grade 1	28,602	9,534	39.79	45.86	+6.07	.34**
Grade 2	29,064	9,688	41.15	44.62	+3.47	.23**
Grade 3	14,402	4,801	37.99	41.41	+3.42	.18**
Grade 4	5,505	1,837	28.62	34.42	+5.81	.28**
Grade 5	3,251	1,088	35.29	41.39	+6.10	.22**

**p<0.01

Table 1: ORF points gained from BOY to EOY by grade and group. The additional gains for the Boost Reading group are calculated by subtracting the comparison group's mean from the Boost Reading group's mean. Positive values indicate that the Boost Reading group outperformed the comparison group.

DIBELS 8th Edition Maze results

Maze is a standardized, group-administered measure of reading comprehension. Maze is administered to students in second grade and beyond. In Maze, the examiner presents students with a passage that has approximately every seventh word removed and replaced with three options. In third through eighth grade, the first and last sentences are left intact, and in second grade, the first two sentences and last sentence are left intact. The final score is one-half the number of overt errors subtracted from the number of Maze words selected correctly within three minutes. Skipped items are treated as errors, but items not reached are not counted as errors.

Students in all grades who used Boost Reading made significantly larger average gains on Maze compared to their matched comparisons, with the largest additional gains in fifth grade (Table 2).

Boost Reading students gained an average of

+0.92

points more than the comparison group on their Maze scores.

DIBELS Maze scores from BOY to EOY

Grade	Comparison group size	Boost Reading group size	Mean BOY to EOY points gained: Comparison group	Mean BOY to EOY points gained: Boost Reading group	Additional points gained for the Boost Reading group	Effect size
Grade 2	28,436	9,479	3.64	4.38	+.74	.17 **
Grade 3	14,070	4,690	4.78	5.31	+.53	.14 **
Grade 4	5,439	1,815	1.32	2.50	+1.18	.20 **
Grade 5	3,305	1,105	10.08	11.31	+1.23	.27 **

$**p<0.01$

Table 2: Maze points gained from BOY to EOY by grade and group. Additional points gained for the Boost Reading group are calculated by subtracting the comparison group's mean from the Boost Reading group's mean. Positive values indicate that the Boost Reading group outperformed the comparison group.

DIBELS 8th Edition Nonsense Word Fluency (NWF) results

NWF is a standardized, individually administered measure of the alphabetic principle. NWF is seen as a "pure" measure of the alphabetic principle, because vocabulary and sight word knowledge cannot play a role in recognizing nonsense words. NWF is administered to students in the beginning of kindergarten through the end of third grade. NWF assesses students' ability to decode words based on the alphabetic principle.

To complete this measure, students are presented with a sheet of randomly ordered VC and CVC nonsense words (e.g., dif, ik, nop) and are asked to read them as best as they can, reading either the whole word or saying the sounds they know.

There are two separate scores reported for NWF: Correct Letter Sounds (CLS) and Words Read Correctly (WRC). CLS is the number of letter sounds produced correctly in one minute. Every correct letter sound receives 1 point for CLS, regardless of whether a student blends the sounds together to read the whole nonsense word. For example, if the stimulus word is "hap," a student could say the nonsense word as a whole or the sounds "/h/ /a/ /p/" individually to receive three letter sounds correct.

Boost Reading students gained an average of

+6.35

more points than the comparison group on their Correct Letter Sounds scores.

DIBELS NWF-CLS scores from BOY to EOY

Grade	Comparison group size	Boost Reading group size	Mean BOY to EOY points gained: Comparison group	Mean BOY to EOY points gained: Boost Reading group	Additional points gained for the Boost Reading group	Effect size
Kindergarten	15,096	5,032	28.98	39.16	**+10.18**	.52**
Grade 1	31,149	10,383	33.75	41.61	**+7.86**	.40**
Grade 2	20,612	6,871	27.05	32.54	**+5.49**	.29**
Grade 3	9,511	3,174	25.92	27.78	**+1.86**	.07**

$**p<0.01$

Table 3: DIBELS NWF-CLS points gained from BOY to EOY by grade and group. Additional points gained for the Boost Reading group are calculated by subtracting the comparison group's mean from the Boost Reading group's mean. Positive values indicate that the Boost Reading group outperformed the comparison group.

WRC is the number of nonsense words read correctly as a whole word in one minute. Words read correctly, whether sounded out initially or not, receive 1 point each for WRC. For example, students would receive 1 point for reading the stimulus word "hap" correctly as a whole word.

Students in all grades who used Boost Reading made significantly larger average gains in both NWF-WRC and NWF-CLS compared to their matched comparisons, with the largest additional gains in kindergarten (Tables 3 and 4).

Boost Reading students gained an average of

+2.71

more points than the comparison group on their Words Read Correctly scores.

DIBELS NWF-WRC scores from BOY to EOY

Grade	Comparison group size	Boost Reading group size	Mean BOY to EOY points gained: Comparison group	Mean BOY to EOY points gained: Boost Reading group	Additional points gained for the Boost Reading group	Effect size
Kindergarten	15,096	5,032	8.38	12.74	+4.36	.55**
Grade 1	31,149	10,383	11.52	15.02	+3.50	.47 **
Grade 2	20,609	6,870	9.33	11.45	+2.12	.31 **
Grade 3	9,501	3,172	8.37	9.24	+.87	.11 **

$**p<0.01$

Table 4: DIBELS NWF-WRC points gained from BOY to EOY by grade and group. Additional points gained for the Boost Reading group are calculated by subtracting the comparison group's mean from the Boost Reading group's mean. Positive values indicate that the Boost Reading group outperformed the comparison group.

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Appendix

	All students	All students (at-risk BOY)	ELLs (at-risk BOY)
Kindergarten	*	*	*
Grade 1	*	*	*
Grade 2	*	*	*
Grade 3	*	NS	NS
Grade 4	*	*	NS
Grade 5	NS	NS	NS
All grades	*	*	*

*p<0.05; NS=Not Significant

Table A1: Statistical significance of the differences between the treatment and comparison groups shown in the figures on pages 3–5 in this report. Analyses were conducted using two-tailed chi-square tests.

	Composite (T)	Composite (C)	ORF (T)	ORF (C)	NWF-WRC (T)	NWF-WRC (C)	NWF-CLS (T)	NWF-CLS (C)	Maze (T)	Maze (C)
Kindergarten	7,183	21,549	–	–	5,032	15,096	5,032	15,096	–	–
Grade 1	10,334	31,002	9,534	28,602	10,383	31,149	10,383	31,149	–	–
Grade 2	8,116	24,333	9,688	29,064	6,870	20,609	6,871	20,612	9,479	28,436
Grade 3	3,941	11,819	4,801	14,402	3,172	9,501	3,174	9,511	4,690	14,070
Grade 4	1,829	5,485	1,837	5,505	–	–	–	–	1,815	5,439
Grade 5	1,099	3,291	1,088	3,251	–	–	–	–	1,105	3,305
All grades	32,502	97,479	26,948	80,824	25,457	76,355	25,460	76,368	17,089	51,250

Table A2: Treatment (T) and Comparison (C) group sample size by grade and outcome measure. Composite = DIBELS Composite Score; ORF = Oral Reading Fluency; NWF-CLS = Nonsense Word Fluency - Correct Letter Sounds; NWF-WRC = Nonsense Word Fluency - Words Read Correctly

Grade	Total number of students	Hispanic	Black	White	Asian	Other	ELLs	SWD	At risk
Kindergarten	7,183	51.97% (3733)	17.97% (1291)	20.49% (1472)	5.23% (376)	4.33% (311)	26.09% (1874)	8.51% (611)	40.18% (2886)
Grade 1	10,334	54.98% (5682)	17.21% (1778)	19.35% (2000)	4.34% (449)	4.11% (425)	23.91% (2471)	8.57% (886)	34.94% (3611)
Grade 2	8,116	56.16% (4558)	17.37% (1410)	19.27% (1564)	3.33% (270)	3.87% (314)	21.49% (1744)	10.47% (850)	36.47% (2960)
Grade 3	3,941	59.58% (2348)	19.64% (774)	15.53% (612)	2.97% (117)	2.28% (90)	27.00% (1064)	13.09% (516)	32.86% (1295)
Grade 4	1,829	51.78% (947)	23.73% (434)	17.55% (321)	3.39% (62)	3.55% (65)	17.77% (325)	13.61% (249)	22.36% (409)
Grade 5	1,099	48.23% (530)	28.94% (318)	16.20% (178)	2.55% (28)	4.09% (45)	14.56% (160)	13.28% (146)	29.85% (328)
All grades	32,502	54.76% (17,798)	18.48% (6,005)	18.91% (6,147)	4.01% (1,302)	3.85% (1,250)	23.5% (7,638)	10.02% (3,258)	35.35% (11,489)

Table A3: Demographic breakdown of the Boost Reading group for the Composite Score measure by grade. Sample sizes are in parentheses. ELL = English language learners; SWD = Students with disabilities; At risk = students who scored well below benchmark at BOY.

Grade	Mean (hours)	Standard deviation	Min (hours)	Max (hours)
Kindergarten	28.8	15.05	15	202.8
Grade 1	28.5	14.32	15	205.1
Grade 2	27.6	13.49	15	227.3
Grade 3	25.6	11.74	15	126.7
Grade 4	24.5	11.77	15	194.4
Grade 5	24.7	11.07	15	103.7

Table A4: Overall Boost Reading use (in hours) for the Boost Reading group by grade

Appendix

	ORF	Maze	NWF-CLS	NWF-WRC
Kindergarten			.52**	.55**
Grade 1	.34**		.40**	.47**
Grade 2	.23**	.17**	.29**	.31**
Grade 3	.18**	.14**	.07**	.11**
Grade 4	.28**	.20**		
Grade 5	.22**	.27**		**p <0.01

Table A5: Effect of Boost Reading on DIBELS change scores from BOY to EOY by grade and outcome measure. Grayed-out measures are not given at that grade. Reported effect sizes are calculated as ES (All Variance), which is a variant of Cohen's d that accounts for the nested structure of students in schools. It takes into account variance both within and between the level 2 variable— our case, schools (Westfall, Kenny, & Judd, 2014).

For more information about Boost Reading, visit **amplify.com/reading.**

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